DOCKET NO. D-96-11-2

DELAWARE RIVER BASIN COMMISSION

Degussa Corporation
Industrial Wastewater Discharge
City of Chester, Delaware County, Pennsylvania

PROCEEDINGS

This docket is issued in response to an application submitted to the Delaware River Basin Commission (DRBC or Commission) by Degussa Corporation on March 22, 2006 (Application), for review of a modification to an existing Industrial Wastewater Treatment Plant discharge. The Pennsylvania Department of Environmental Protection (PADEP) issued the draft National Pollutant Discharge Elimination System (NPDES) Permit No. PA0051713 on August 17, 2006 for this project.

The Application was reviewed for approval under Section 3.8 of the *Delaware River Basin Compact*. The Delaware County Planning Department has been notified of pending action. A public hearing on this project was held by the DRBC on September 27, 2006.

A. DESCRIPTION

1. **Purpose**. The purpose of this project is to expand the docket holder's industrial wastewater treatment plant's (IWTP) discharge from 0.95 million gallons per day (mgd) to 1.15 mgd. The increased discharge is requested in order to handle additional process wastewater produced as a result of increased production.

2. **Location**. The project IWTP is located adjacent to the Delaware River just off Front Street in the City of Chester, Delaware County, Pennsylvania. The IWTP will continue to discharge to the tidal Delaware River in Water Quality Zone 4 at River Mile 82.2.

The project outfall is located in the Delaware River Watershed as follows:

OUTFALL NO.	LATITUDE (N)	LONGITUDE (W)
001	39° 50' 10"	75° 22' 18"

3. **Area Served**. The IWTP will continue to serve only the docket holder's onsite silica production operations. For the purpose of defining the Area Served, the Application is incorporated herein by reference consistent with conditions contained in the DECISIONS section of this docket.

4. Physical features.

a. Design criteria. The Degussa Corporation proposes to increase its average monthly discharge from 0.95 mgd to 1.15 mgd and to expand its IWTP by constructing additional facilities for processing wastewater generated by the manufacturing of precipitated silica. Precipitated silica is an inorganic chemical produced by a precipitation reaction between sodium silicate and sulfuric acid. After the precipitation reaction occurs, filter presses are used to produce filter cakes of silica. The precipitated silica is used as a reinforcing filler, abrasive, thickener, and in other products. Filter press wash water, filtrate and miscellaneous wash waters are collected in a sump and pumped to the IWTP.

The IWTP will continue to remove and recycle suspended solids via a clarification and polymer addition system, flocculation, pH control and effluent temperature control.

Degussa has requested a revised Total Dissolved Solids (TDS) determination for the expanded IWTP. Degussa, prior to this request, had an allowable monthly average effluent limit for TDS of 30,000 mg/l. This corresponds to a discharge concentration load of 237,819 lbs/day, however, Degussa's prior docket mistakenly had a corresponding discharge load of 175,000 lbs/day. Degussa, prior to this request, had an allowable daily maximum effluent limit for TDS of 32,000 mg/l. That effluent limit should correspond to a discharge concentration load of 253,674,000 lbs/day, however, Degussa's prior docket mistakenly had a corresponding discharge load of 185,000 lbs/day. The new TDS determination will increase the average monthly load to 287,890 lbs/day (30,000 mg/l) and to 307,080 lbs/day (32,000 mg/l) as a daily maximum value, based upon the ultimate flow of 1.15 mgd.

b. Facilities. The existing IWTP facilities consist of a collection sump where pH adjustment and natural flow equalization is achieved while positive suction head is given to wastewater from the filter presses. An electronically controlled chemical feed pump supplies caustic solution to the sump. Just downstream of the sump, two screens keep large objects from entering the next treatment process, a heat exchanger. Wastewater from the collection sump is pumped through two shell and tube-type heat exchangers prior to polymer addition.

The IWTP uses its municipal water supply (from the City of Chester) as a heat sink for lowering wastewater temperature. Polymer is injected into the collection sump discharge to enhance flocculation and sedimentation of suspended solids. Wastewater is conveyed to a cyclator, a conical-shaped clarifier providing for liquid/solids separation with the aid of centrifugal force. The existing cyclator has a volumetric capacity of 52,835 gallons and is able to process 0.864 mgd. Solids are thickened and collected from the conical bottom. Approximately 67 percent of the solids removed from the thickener can be recycled back to the collection sump and the remaining solids are pumped to the suspension tank which stores the silica slurry prior to dewatering. Clarified wastewater flow by gravity over the cyclator weir to an existing neutralization tank where pH adjustment is made by the addition of caustic solution,

as needed. An equalization tank provides detention time for proper control of the neutralization process. The discharge pipe extends approximately 300 feet into the Delaware River and is supported by a pier (which also has a diesel fill line and a sodium silicate pipeline). The discharge head consists of a multiport diffuser (five ports 18 inches on center) extending vertically from the pier with the uppermost port located approximately one foot below the mean low water elevation.

The expanded IWTP will include all the existing facilities with the addition of an 8th filter press.

Prior facilities and processes for the IWTP have been described in DRBC Dockets Nos. D-96-11, approved by DRBC on December 11, 1996. Previous to 1996, the facilities permitted discharge was below 50,000 gpd.

The project facilities are protected from the 100-year flood zone by dikes.

In the event of power failure, production ceases, the IWTP shuts down, and the discharge is discontinued. Production is not resumed until the IWTP is back online.

Wasted sludge will be hauled off-site by a licensed hauler for deposit at a (State-approved) facility.

c. Water withdrawals. The potable water supply in the project service area is provided by the City of Chester Water Authority. The water withdrawal is described in detail in Docket No. D-89-17 CP, which was approved on January 12, 1990.

d. NPDES Permit / DRBC Docket. The draft NPDES Permit No. PA0051713, issued on August 17, 2006, includes final effluent limitations for the project discharge of 1.15 mgd to surface waters classified by the PADEP as Warm Water Fishes (WWF) and Migratory Fishes (MF). The following average monthly effluent limits are among those listed in the NPDES permit and meet or are more stringent than the effluent requirements of the DRBC.

EFFLUENT TABLE A-1: DRBC Parameters Included in NPDES Permit No. PA0051713 for Outfall 001

OUTFALL 001 (IWTP discharge)		
PARAMETER	**LIMIT**	**MONITORING**
pH (Standard Units)	6 to 9 at all times	As required in NPDES Permit
Total Suspended Solids	100 mg/l (85 % minimum removal*)	As required in NPDES Permit
Temperature	110 ^{o} F (Max)	As required in NPDES Permit
Total Dissolved Solids*	287,890 lbs/day: monthly avg (30,000 mg/l)* 307,080 lbs/day: daily max (32,000 mg/l)*	As required in NPDES Permit

* DRBC Requirement

Effluent Table A-2 contains effluent limits and monitoring requirements for DRBC parameters not included in NPDES Permit No. PA0051713

EFFLUENT TABLE A-2: DRBC Parameters for Outfall 001 Not Included in NPDES Permit No. PA0051713

OUTFALL 001 (IWTP Discharge)		
PARAMETER	**LIMIT**	**MONITORING**
Dissolved Oxygen *	6.0 mg/l (minimum at all times) *	One per Quarter *
Chronic and Acute Toxicity	**	**

* DRBC Requirement

** DRBC Whole Effluent Toxicity Requirements for Estuary Dischargers

The permittee must perform quarterly Whole Effluent Toxicity (WET) tests to generate acute and chronic toxicity data on the cladoceran, *Ceriodaphnia dubia* and the fathead minnow, *Pimephales promelas* for the first two years of the docket cycle. The results shall be reported as No Observed Effect Concentration (NOEC) and Chronic Toxic Units (TUc) with a Percent Minimum Significant Difference (PMSD) reported. The results shall also be reported as Inhibitory Concentration, 25 percent (IC_{25}). After completing four acceptable toxicity tests, the permittee may request that testing be limited to the most sensitive species. After two years, the testing frequency may be reduced or eliminated based on the results.

In lieu of conducting separate acute and chronic toxicity tests, the permittee may utilize the survival data from chronic toxicity tests to calculate 48-hour and 96-hour LC_{50}. The 48-hour and 96-hour LC_{50} data and Acute Toxic Units (TU_a) shall also be reported with the chronic toxicity results.

The testing should follow USEPA guidance on Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms.

e. **Cost**. The overall cost of this project is estimated to be $ 1,500,000.

B. FINDINGS

By letter dated May 24, 1996, the Commission established a TDS mixing zone for the project discharge. The mixing zone is defined as the area 3,000 feet upstream and downstream of the discharge point, and within a width of 1,000 feet. The Commission determined that compliance with the mixing zone requirement would prevent an adverse impact on nearby water users. Degussa then completed a plume (dilution) analysis of its discharge of 0.45 mgd by using a dye study to confirm that the effluent did not increase TDS in the estuary by more than 50 mg/l above background, except within the assigned mixing zone. At the time of the plume dilution analysis, a subsequent model then predicted that an increase in the discharge to 0.95 mgd could be expected to increase the TDS within the existing mixing zone boundary by about 12 mg/l above background, still well within the 50 mg/l limit. Docket No. D-96-011 required the docket holder to conduct a plume monitoring program demonstrating compliance with the mixing area limits as the facility neared design load.

On October 14, 2005, Degussa submitted an NPDES renewal application to PADEP. Within the application package, Degussa requested an increase in its permitted discharge from 0.95 mgd to 1.15 mgd, as the facility was approaching their permitted discharge limit. Accompanying the request for the increase in discharge was a proportional increase in the mass effluent limits for TSS and TDS.

Degussa submitted DRBC docket application forms on March 22, 2006, requesting an increase in flow from 0.95 mgd to 1.15 mgd, and a new TDS determination for a monthly average discharge limit of 30,000 mg/l and a daily maximum limit of 32,000 mg/l.

On July 31, 2006, Degussa submitted the results of a modeling exercise performed by HydroQual Inc. which satisfied both the DRBC docket requirement and PADEP's NPDES permit (see file). The analysis was performed at 7Q10 low flow conditions using a steady-state, tidally averaged water quality model. Effluent flows of 0.95 mgd and 1.15 mgd were analyzed at a daily maximum effluent TDS concentration of 32,000 mg/l. In addition, the 1995 dye study was used to determine dispersion coefficients for use in the analysis. The results of the study demonstrate that the proposed increase in effluent flow from 0.95 mgd to 1.15 mgd is not projected to increase background TDS levels by more than 50 mg/l at the edge of the mixing zone. Projected increases in TDS at the edge of the mixing zone are calculated to be between 10 and 35 mg/l.

The limits in the NPDES Permit are in compliance with Commission effluent quality requirements, where applicable.

The project is designed to produce a discharge meeting the effluent requirements as set forth in the *Water Quality Regulations* of the DRBC.

At the project site, the Delaware River has an estimated seven-day low flow with a recurrence interval of ten years of 2,604 mgd (4,030 cfs). The ratio of this low flow to the average design wastewater discharge (0.95 mgd / 1.47 cfs) from the Degussa IWTP is 2,741 to 1.

There are no surface water intakes of record for public water supply downstream of the project discharge.

The project does not conflict with the Comprehensive Plan and is designed to prevent substantial adverse impact on the water resources related environment, while sustaining the current and future water uses and development of the water resources of the Basin.

C. DECISION

I. Effective on the approval date for Docket No. D-96-11-2 below, Docket No. D-96-11 is terminated and replaced by Docket No. D-96-11-2.

II. The project and appurtenant facilities as described in the Section A of this docket entitled "Physical features" above are approved pursuant to Section 3.8 of the *Compact*, subject to the following conditions:

a. Docket approval is subject to all conditions, requirements, and limitations imposed by the PADEP in its NPDES permit (and Part II Permit if appropriate), and such conditions, requirements, and limitations are incorporated herein, unless they are less stringent than the Commission's. Commission approval of this docket is contingent on the PADEP's approval of the NPDES permit.

b. The facility and operational records shall be available at all times for inspection by the DRBC.

c. The facility shall be operated at all times to comply with the requirements of the *Water Quality Regulations* of the DRBC.

d. The docket holder shall comply with the requirements contained in the Effluent Tables in the Section A.4.d. of this docket. The toxicity monitoring results should be forwarded to the Modeling and Monitoring Branch of the Commission on an annual basis.

e. Except as otherwise authorized by this docket, if the docket holder seeks relief from any limitation based upon a DRBC water quality standard or minimum treatment requirement, the docket holder shall apply for approval from the Executive Director or for a docket revision in accordance with Section 3.8 of the *Compact* and the *Rules of Practice and Procedure*.

f. If at any time the receiving treatment plant proves unable to produce an effluent that is consistent with the requirements of this docket approval, no further connections shall be permitted until the deficiency is remedied.

g. Nothing herein shall be construed to exempt the docket holder from obtaining all necessary permits and/or approvals from other State, Federal or local government agencies having jurisdiction over this project.

h. The discharge of wastewater shall not increase the ambient temperatures of the receiving waters by more than 5 °F, nor shall such discharge result in stream temperatures exceeding an average daily temperature of 86 °F, except within an assigned heat dissipation area consisting of an area within a 130-foot radius of Outfall 001

i. The effluent from Outfall 001 shall not increase the TDS in the Delaware River Estuary, Water Quality Zone 4, by more than 50 mg/l above background levels except within a mixing zone extending 3,000 feet upstream and downstream of the outfall, and 1,000 feet in width.

j. Sound practices of excavation, backfill and reseeding shall be followed to minimize erosion and deposition of sediment in streams.

k. Within 10 days of the date that construction of the project has started, the docket holder shall notify the DRBC of the starting date and scheduled completion date.

l. Upon completion of construction of the approved project, the docket holder shall submit a statement to the DRBC, signed by the docket holder's engineer or other responsible agent, advising the Commission that the construction has been completed in compliance with the approved plans, giving the final construction cost of the approved project and the date the project is placed into operation.

m. This docket approval shall expire three years from date below unless prior thereto the docket holder has commenced operation of the subject project or has expended substantial funds (in relation to the cost of the project) in reliance upon this docket approval.

n. The docket holder is permitted to treat and discharge the categories of wastewaters defined in the “Area Served” section of this docket.

o. The docket holder shall make wastewater discharge in such a manner as to avoid injury or damage to fish or wildlife and shall avoid any injury to public or private property.

p. No sewer service connections shall be made to newly constructed premises with plumbing fixtures and fittings that do not comply with water conservation performance standards contained in Resolution No. 88-2 (Revision 2).

q. Nothing in this docket approval shall be construed as limiting the authority of DRBC to adopt and apply charges or other fees to this discharge or project.

r. The issuance of this docket approval shall not create any private or proprietary rights in the waters of the Basin, and the Commission reserves the right to amend, suspend or rescind the docket for cause, in order to ensure proper control, use and management of the water resources of the Basin.

s. A complete application for the renewal of this docket, or a notice of intent to cease the operations (withdrawal, discharge, etc.) approved by this docket by the expiration date, must be submitted to the DRBC at least 12 months prior to the expiration date below (unless permission has been granted by the DRBC for submission at a later date), using the appropriate DRBC application form. In the event that a timely and complete application for renewal has been submitted and the DRBC is unable, through no fault of the docket holder, to reissue the docket before the expiration date below, the terms and conditions of this docket will remain fully effective and enforceable against the docket holder pending the grant or denial of the application for docket approval.

t. The Executive Director may modify or suspend this approval, or require mitigating measures, pending additional review.

u. The docket holder and any other person aggrieved by a reviewable action or decision taken by the Executive Director or Commission pursuant to this docket may seek an administrative hearing pursuant to Articles 5 and 6 of the Commission's *Rules of Practice and Procedure*, and after exhausting all administrative remedies may seek judicial review pursuant to Article 6, section 2.6.10 of the *Rules of Practice and Procedure* and section 15.1(p) of the Commission's *Compac*t.

BY THE COMMISSION

DATE APPROVED: **September 27, 2006**

EXPIRATION DATE: **September 27, 2011**